FFORMS: Feature-based FORecast Model Selection

Abstract

Features of time series are useful in identifying suitable models for forecasting. We present a general framework, labelled FFORMS (Feature-based FORecast Model Selection), which selects forecast models based on features calculated from the time series. The FFORMS framework builds a mapping that relates the features of a time series to the "best" forecast model using a random forest. The framework is evaluated using time series from the M1 and M3 competitions and is shown to yield accurate forecasts comparable to several benchmarks and other commonly used automated approaches of time series forecasting. Furthermore, we explore what is happening under the hood of the FFORMS framework. This is accomplished using model-agnostic machine learning interpretability approaches. The analysis provides a valuable insight into how different features and their interactions affect the choice of forecast model.

Keywords: Algorithm selection problem, Time series, Random forest, Machine learning interpretability